

BEST PRACTICE PROGRAMME

Good Practice Case Study

Bartley Meadow Totton Hampshire Laing Homes Ltd.

Background

Laing Homes are among the top ten volume housebuilders in the country, building about 3500 homes a year. Most properties are built in timber frame, using the Laing 'Superhomes' design. The in house design team at Milton Keynes produces a comprehensive range of standard plan types ranging from studio flats to executive detached houses.

The choice of timber frame construction and standard plan types enables the company to manage the ordering and delivery of materials, as well as the construction process on site, in a highly organised way. This is demonstrated by their use of a comprehensive site construction manual as well as stringent checking procedures at each stage of construction. It is these well established management procedures, combined with a strong commitment to training site personnel, which make possible the high quality of construction for which Laing Homes are renowned.

The Case Study is based on the 'Regent' 2 bedroom house at Bartley Meadow, a development of 1 bedroom flats and 2, 3 and 4 bedroom houses at Totton near Southampton. The large site at Totton, which is now nearing completion, was begun over 5 years ago and contains over 500 energy efficient houses.

The energy efficiency package

- Timber frame with 90mm mineral wool batts between the studs (U value 0.33)
- 120mm mineral wool quilt as loft insulation (U value 0.29)
- Ground floor slab finished with 68mm Styrofloor (U value 0.35)
- High performance single glazed windows (with double glazing option) with factory fitted weatherstripping and trickle vents
- 'Swedoor' external doors (U value 1.0) complete with weatherstripped frame, draught-sealed letterbox and double glazed openings.



A pair of Regent houses ready for occupation

ENERGY

EFFICIENCY IN

NEW HOUSING



Energy Efficiency Office
DEPARTMENT OF THE ENVIRONMENT

ARCHIVED DOCUMENT

(R5)
C1/Sfb 1976 (81)(Y2)

BARTLEY MEADOW, TOTTON

The use of timber framed construction in combination with floor insulation above the slab avoids all cold bridging through the structure and the polythene vapour check in the external wall helps to minimise air leakage.

The external doors were chosen by Laing Homes, mainly because of the insulating qualities, but they also help to overcome complaints from customers about warping and twisting of the more conventional framed and panelled types of external doors. The insulated doors have plywood facings and a sheet of aluminium each side of a solid wood fibre core which not only gives the door dimensional stability under changing weather conditions but also, (in conjunction with weather-stripping) minimises heat loss.

A Construction Manager for Laings pointed out that it is immediately noticeable, when entering a Laing timber frame property, that it feels warm. This is put down not only to the good level of insulation and the 'dry' form of construction, but also to the fact that the insulation is close to the internal surfaces, making it possible for the gas warm air heating to warm the house very quickly, even when left unheated during the day.

Design and construction

The 'Regent' is a 2 storey, 2 bedroom design with open-plan ground floor, normally built either in short terraces or in combination with 3 bedroom houses. Construction was timber frame, faced in brick, with an in-situ ground slab and trussed rafter roof.

All the structural shell components for the Laing timber frame homes are supplied from a central warehouse in Sandy, Bedfordshire. The windows and external doors are fixed to the timber frame in the factory and delivered to site complete with glazing and ironmongery, all protected by

polythene sheet. The remaining components to complete the homes (excluding roof tiles and external cladding) are supplied from Superhomes' own warehouse in Milton Keynes.

Buildability

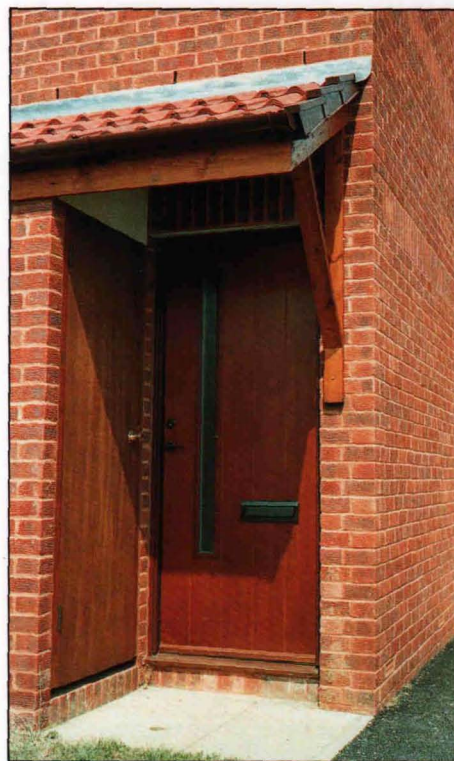
Two aspects were mentioned in discussion with the builder.

Prior to 1981, Laings used to use a polythene sheet as a vapour check at ceiling level, in line with NHBC requirements current at the time. However, the general experience was that condensation could form on the polythene, e.g. where the membrane was punctured for cables, or at breaks in the insulation.

Laing Homes, therefore, no longer use a vapour check below the loft spaces of pitched roofs. Their strategy is to ensure that any moisture that permeates into the loft space is ventilated away harmlessly by unobstructed eaves ventilation. This is in line with current good practice and NHBC Technical Requirements.

The second buildability issue concerned the use of composite boards of insulation and chipboard to insulate the ground floors.

At present, 2.4m x 600mm sheets of tongued and grooved Type II/III chipboard (with 50mm Styrofoam bonded to the back) are laid directly on the concrete ground slab. However, because of their size and weight, the composite boards are difficult to carry into the house. This is particularly so when it is not possible to stack the bulky flooring panels directly outside the dwelling. Cutting away the insulation from the back of the board, to accommodate service pipes, can also be a tedious task. To avoid these problems and to make handling easier, Laing Homes are now considering laying the insulation and chipboard separately.



The Swedoor insulated front entrance door.

Building Costs

The extra cost of the total energy efficiency package for the 'Regent' was estimated by Davis Langdon and Everest to be about £700 compared to the same timber frame house built to current standards. Of this total price some £500 related to floor insulation and the provision of trickle ventilators in the window heads. The anticipated selling price in July 1989 was £73 450, so the extra cost of the energy package was about 1% of the selling price.

Marketing

Laing Homes have marketed 'Superhomes' since 1981 using timber frame construction which meant that it was easy to achieve a high level of wall insulation. Together with insulated external doors and floors, 'Superhomes' were marketed from the beginning as being low energy and economic to keep warm.

The idea of specifying highly 'visible' components such as fitted kitchens and bathrooms, as a selling aid, was extended to encompass high performance windows and external doors. The extra solidity of construction and better standard of ironmongery that typify high performance windows and doors helped to improve the perceived quality of 'Superhome' schemes.

An added bonus has been the reduction in the number of complaints and call backs due to excessive twisting and warping of the door and window frames.



Removing the floor insulation to accommodate pipe runs

Energy and cost savings

The BRE Domestic Energy Model (BREDEM) was used to estimate the differences in energy use between the 61 m² Regent and the same house assumed to be built to the 1982 Building Regulations thermal standards. The calculations showed that the energy saving package can produce annual savings in space heating of up to 41% compared to 1989 standards, and 30% compared to standards applicable from 1990. If the house were heated 16 hours a day during the winter period, the estimated saving would be in the order of £48 a year; for 9 hours a day heating, the saving would be nearer £38.

Assumptions

Estimates of annual fuel consumption for space heating using BREDEM. Annual average external temperature:

- Southern England = 10.34°C
- Midlands (UK average) = 9.54°C
- Living room demand temperature = 21°C
- Efficiency of warm air boiler = 70%

Estimates of costs and savings from energy efficiency measures

Estimates of extra capital cost are based on the Architects and Builders Price Book, edited by DL&E, and published by E&FN Spon. Costs have been adjusted for Southern England (location factor from the Building Cost Information Service of the RICS). The insulated ground floor has been costed against a screeded floor with no floor finish applied.

Fuel cost savings are based on a gas price of 38.5 p/therm.

Acknowledgements

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